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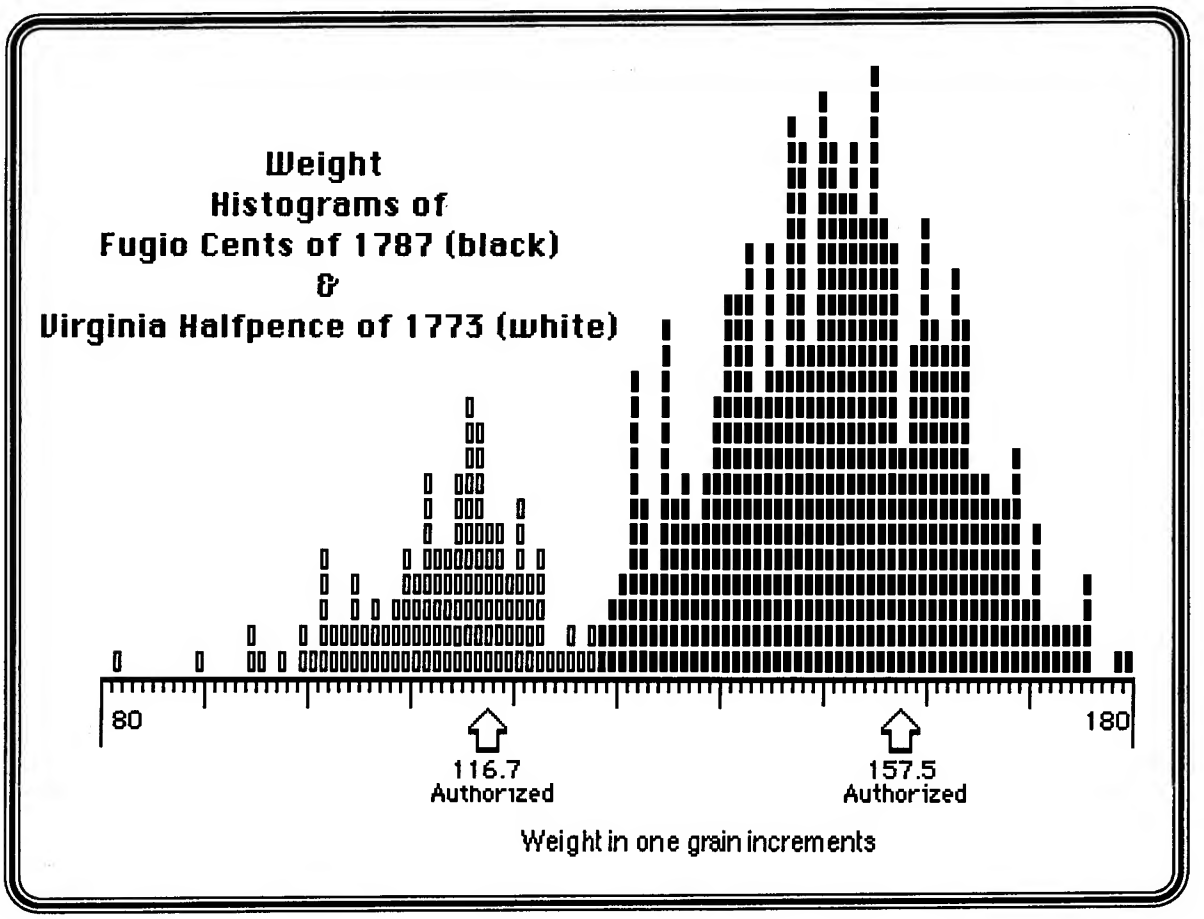


Preliminary Report
CNL Fugio Weight Survey

Sequential page 1053

Preliminary Report
CNL Fugio Weight Survey

Introduction

The Colonial Newsletter Foundation, in cooperation with our Patrons who have indicated an interest in the Fugio Cents of 1787, and with several major institutions, is conducting a survey of the weights of this important early American coinage. The purpose of the survey is to determine the statistical weight characteristics of the coins and to make an attempt to identify any unusual facts regarding these weights that might add to our knowledge of the series.

This report is preliminary because the survey is designed to be a continuing process with an objective of obtaining as much data as possible from as many different specimens as possible. This report summarizes the results of the first attempt to realize that objective and we believe publication will result in additional contributions of data on many more specimens than have been surveyed to date.

The two page Summary Worksheet presented in Appendix A is a tabulation of statistical information organized by coinage type and die-variety. For example, for the Fine Ray Fugio type we have data on 587 specimens; for the Club Ray types, 76 specimens, and for the New Haven types, 36 specimens. Under each type heading the data is broken out by individual die-varieties. In several cases we have provided separate rows for varieties which occur with both normal (180°) die juxtaposition and upset (0°) juxtaposition and for several varieties where only upset (0°) juxtapositions are known. There are many questions that will arise for numismatists, very few of whom are mathematicians and the first question is probably -- what do all of these numbers mean? We shall attempt to answer this question as we go along.

Shown on this Summary Worksheet are nine columns of information. These are VARIETY (in this case die-variety in accordance with the attribution scheme of Eric P. Newman). Next is COUNT which is the number of specimens in a particular row of data. Next is AVERAGE which is the average weight (in grains) of all the specimens in that row and, following that is HI which is the highest weight in grains, and next is LOW which is the lowest weight in grains in the sample of specimens tabulated in that row. Following are two columns of statistical data which have been calculated by computer from the individual specimen weights that have been entered in the computer data base from the information furnished by our Patrons and other organizations; these two are STD.DEV. (Standard Deviation) and VARIANCE. These two values are very meaningful to mathematicians but may not, as yet, mean a thing to the average numismatist. The next column is the 1984 RARITY for each variety (which needs updating) and the last column is a reference to various notes presented at the bottom of the second page of the chart.

The first objective of this preliminary report is to present a summary of the data obtained to date and to request additional data from our Patrons, and secondly - to present a few very preliminary ideas that have resulted, so far, from the survey. These ideas will serve as guidelines for new directions to look for information or new avenues of research that may be suggested by the results. We propose to continue searching for additional weight data, building the data base and analyzing the results until we reach a point where the results become meaningful in a statistical sense.

In this paper we are using a graphical method called a HISTOGRAM for presenting the weights data.The histogram on the frontispiece of this issue is actually two histograms, one superimposed on another so that the differences as well as common features can be visualized. The larger of the two represents the 587 Fine Ray Fugios currently in our database; the smaller group (the white ones) represent xxx specimens of Virginia Halfpence of 1773. We specifically selected the Fugio coinage because we know that these coins were manufactured within a very limited time span and, we believe, there are enough extant specimens to eventually provide a meaningful quantity for purposes of statistical analysis.

The Virginia Halfpence were selected as a comparison of another coinage series also produced within a short time span in a comparable era but in what we think would have been a more sophisticated manufacturing environment. In other words -- we believe the experienced Tower Mint in London would have produced a better and more consistent product than would the inexperienced Early American mint that produced the Fugio Cents of 1787.

Let us consider, before we get into the mechanics of histogram construction, some of the problems that faced the Fugio coiners. The technical and logistical problems for manufacturers during the 1787 era must have been awesome indeed. The new Nation had just completed an exhausting revolution which culminated an era where all manufactured products of any consequence were by law required to be imported from England, and manufacturing within the Colonies had been prohibited. As a consequence of these two debilitating requirements there must have been an extreme shortage of all types of machinery and tools, many raw materials, and even a shortage of skilled craftsmen. Consider, for example, these very problems documented at the First United States Mint by Frank H.Stewart in his book *History of the First United States Mint.* (Privately printed, 1924). Yet, the new Nation prevailed and eventually prospered as these problems yielded to American ingenuity.

Many numismatists today seem to think of the Early American coiners in overly simplistic terms; they simply took sheet copper, punched out planchets from it and then stamped them in a press between a pair of dies. Seldom is consideration given to such questions as -- where did they obtain sheet copper? Where did they obtain the tools? What sort of press was used? Where did they obtain the dies? How was the coinage product shipped? And on and on!

Consider just two of these problems -- that of sheet copper and that of punching planchets. The coiners objective was, in the case of the Fugio Cents, to produce a coin meeting the specifications of Congress regarding weight, 157.5 grains, and exhibiting the appropriate design. Obtaining the correct planchet weight would have been a major problem in itself. If we assume that a planchet cutting tool was designed and built, then it would have required that sheet copper stock of an exact thickness be obtained so that a planchet punched out by this cutting tool would have the correct weight of 157.5 grains! If too thick, too heavy -- if too thin, too light. An alternative would be to have several cutting tools available, each having a slightly different diameter so that, if the copper sheet were slightly too thick, then a slightly smaller diameter planchet could be cut and thus compensate.

The evidence presented by the Fugio coins, today, suggests that the Early American coiners did not have the luxury of multiple tools, and that only one cutting tool was available at the Fugio mint, and that it was used for both Fugio Cents and many of the Connecticut Coppers (those produced by James Jarvis and his Company for Coining Coppers). In this case it was necessary to have very close control over the thickness of copper sheet which in turn required a very precise control of roller spacing and - of basic roller design and construction , as well. Given the difficulty of availability of manufacturing tools, producing precision thickness copper sheet, from whatever source of copper stock, would have been a severe problem. Because of this difficulty, we would expect to find that the weights of the Fugio coins would vary substantially with some being much too light and some much too heavy. With any success at all with the rolling process we would anticipate that most would be somewhere close to the 157.5 grain specification. Making a determination regarding that feature -- the variation -- is also a major purpose of this study.

We know that the experienced workers at the Tower Mint in London had been beset with these same problems for many years and had come up with several solutions. One legalistic approach was the simple expedient of using an average weight for a group of (copper) coins and accepting all of them if the average was within specified limits, usually 2% but enlarged to 3% for the Virginia issue possibly because the copper sheet was procured from an outside source. Another was the use of an ingenious planchet cutting machine built and installed in the Tower Mint by Matthew Boulton. This was a veritable monster requiring its own building and providing a multiplicity of cutting mechanisms each having slightly different diameters so

that not only could different denomination planchets be cut simultaneously, but slightly different diameter cutters could be used to offset the failure, even with their experience, of producing metal sheets of precise thickness. This machine may have been in use for the production of the Virginia Halfpence of 1773 and we would anticipate finding, therefore, the Virginia Coinage to have a much more concise statistical grouping -- a much smaller dispersion -- than would the Fugio Cents manufactured under much more inexact weight control techniques. Accordingly, the idea of comparing these two coinages evolved sometime after the Fugio weight study commenced and is included somewhat as an afterthought and, therefore, we do not have nearly as much Virginia data as we have Fugio data.

A statistical study, regardless of its complexity, can be summarized by a single word -- *variation.* The weights of the planchets varied substantially because of the factors already mentioned, but primarily because of the differences in thickness of copper sheet used in their manufacture. In dealing with the coins, today, some other factors enter into the problem, the principal one being additional variations such as the loss of weight caused by the wear and tear of circulation encountered over some 200 years of existence.

We are not attempting in this report to get into an esoteric analysis of data. The first reason being that there is, we believe, insufficient data to yield creditable results -- especially at the die-variety level, and secondly such analysis would have little meaning to the average numismatist. Our effort here is, instead, to present a limited overview of statistical concepts and to present -- at least -- a general idea of the meaning of several of the numbers contained in the Summary Worksheet. Indepth analysis will be accomplished at a later time as additional weights data becomes available. Our limited discussion of these statistical concepts is contained in Appendix A for the benefit of those who may find them of interest. Suggestions from our Patrons knowledgeable in statistical analysis will be sincerely appreciated.

General Approach

Over the years CNL has requested that our Patrons fill out an Interest Questionnaire which includes a question regarding the individual's major collecting interest. There was mailed to each Patron who had listed the Fugio Cents of 1787, a blank data sheet to be filled out listing the characteristics of Fugios in their collections. The identity of these Patrons is confidential. The same data sheet was mailed to each of the public institutions known to have substantive collections of Fugios. Later, similar data was requested regarding the Virginia Halfpence of 1773. The institutions which responded to our requests are listed in the Acknowledgments on Page 1062.

We are certain that we have missed many Fugios in the initial Patron survey. Included on the two unnumbered pages which make up Appendix C are copies of the two survey sheets and we request that anyone having either Fugios or Virginia Halfpence, who has not yet responded, to please fill out the sheets and mail them to ye Editor at CNL. It is important that we do NOT duplicate data already in the database. Accordingly, please limit your replies to those FUGIO CENTS in your collection as of January 1, 1988 and VIRGINIA HALFPENCE as of April 1, 1988. In addition, it is equally important that you identify on the sheets any specimens from major collections auctioned during recent years because some of these specimens may already be included in the CNL database.

If you own any of the specimens from these sales, please be sure to indicate this on your sheet OR simply do not include them in your listing. Weights may be entered in grams or grains. If you desire to remain anonymous please enter a code word in place of your name on the survey sheet. In any event the identities of CNL Patrons and their collections will remain confidential. Please note that we are interested in obtaining data on the "New Haven" Fugios as well as the regular Fine Ray and Club Ray issues, and on all Virginia Halfpence whether or not attributed by die-variety.

Fugios and Virginia Halfpence from the following major auction or estate sales ARE ALREADY included in the current data:

(1) Picker Collection --- October 24, 1984
(2) Roper Collection --- December 8 & 9, 1983
(3) Norweb (III) Collection --- November 14 & 15, 1988
(4) Garrett Collection (II) --- October 1 & 2, 1980
(5) D.G.Douglas Estate
(6) Taylor Collection --- March 26-28, 1987
(7) Hall Estate

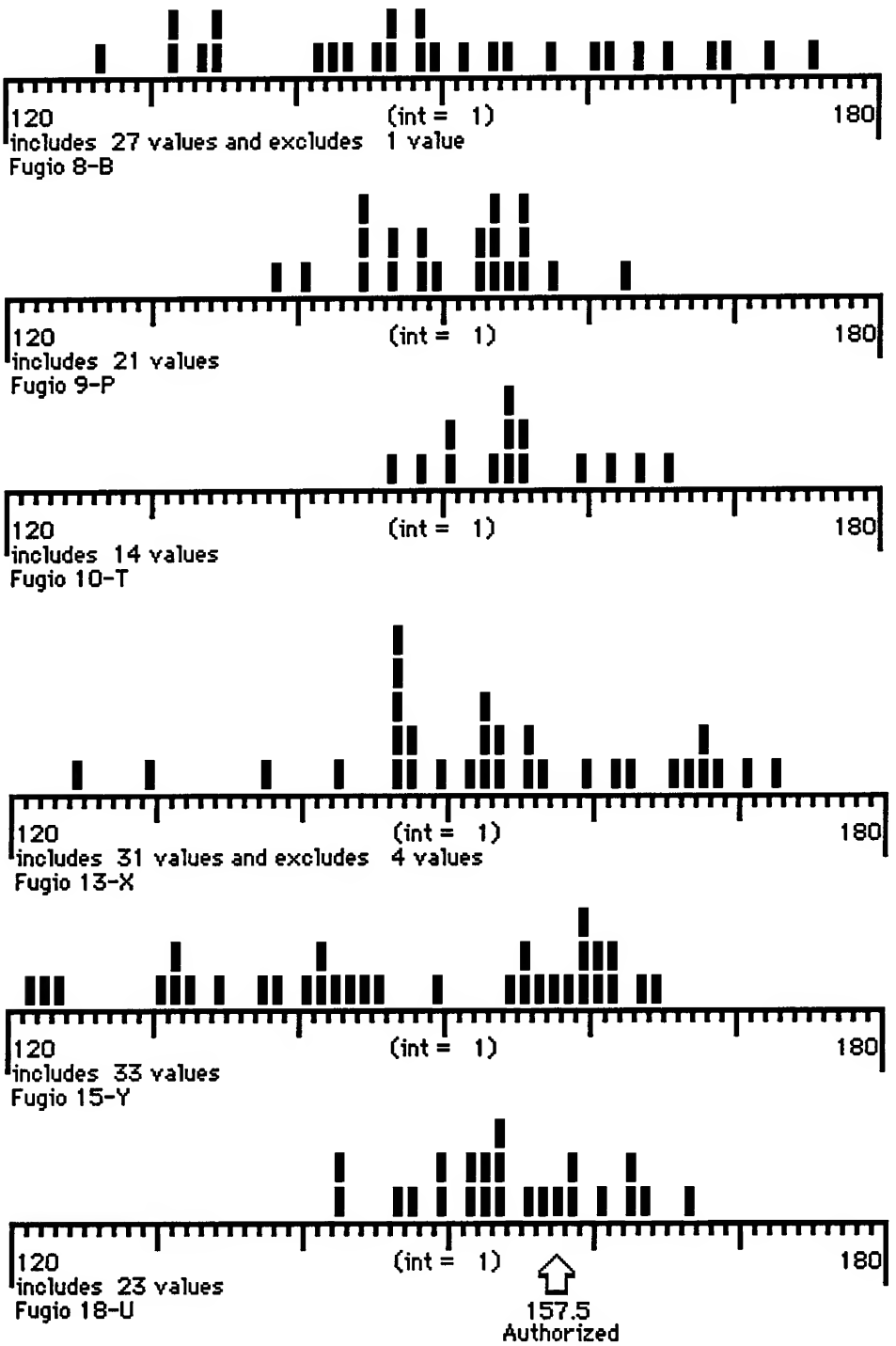
We hope to eventually obtain data on at least 2000 Fugio specimens. During this preliminary survey we have attempted to locate the original notes made by the late Damon G. Douglas when he weighed, at ANS, the Fugio specimens in the Bank of New York Hoard. Unfortunately this search has, so far, been unsuccessful. The summary results presented in the Douglas manuscript "James Jarvis and the Fugio Coppers" which is preserved in the ANS Library contains averages and several plots, but not the detail weights of individual specimens required for a statistical analysis. Hopefully these original notes will someday be located. Access to the data on the large quantities of the six die-varieties in the hoard would have been extremely helpful in the present study.

Histograms

A histogram presents data in a graphical format that allows visualization of three important statistical ideas. These are the *variation* of the data, the *shape* of the data, and the *position* of the distribution. Please see Appendix A for a summary of important types of shapes likely to be encountered in a statistical distribution. A histogram depicts information in picture form that could be obtained by someone working in a real life situation. For example, you have a group of coins, such as Fugios, and you are weighing them individually and recording their weight on paper. At the same time you have drawn an indicator scale on the tabletop extending, say, from 100 grains to 200 grains and you have marked this indicator in one grain increments with about one and a half inch spacing for each increment. You are working at your kitchen table and your indicator extends from one end of your table to the other. After you weigh each specimen you place the coin on the indicator at the proper weight marking. As you go along you discover that most of your specimens lie somewhere near the authorized weight of 157.5 grains, but some are heavier and some are lighter. As you continue this process the stacks of coins near the 157.5 mark grow taller but further away, in both directions, the stacks are smaller. Out toward the ends a few very heavy or very light specimens are positioned. If you had a large quantity of Fugios available for this process you would discover that the tops of the individual stacks form a curve shaped somewhat like the outline of a bell, or it might have a different shape such as one of those discussed in Appendix A; however, for your Fine Ray Fugios you would discover that the tops of the stacks form a bell shaped curve. To a statistician this is known as a *normal* curve.

The histograms presented in this report are generated by computer from the weights data stored in our database and are plotted in exactly the same manner described above in the kitchen table example. All of the hard work of sorting weights of individual specimens into their various categories, such as die-varieties, and the associated construction of the histograms, as well as the application of various esoteric statistical formulae and analytical processes is accomplished quickly and accurately by computer. This process is carried out in a large computer "spreadsheet" The information from our Patrons is entered into the spreadsheet line by line just as it is received, one specimen at a time. Then the computer does all the sorting and calculations necessary to derive statistical numbers and generate the histograms for visualization. Once the statistical numbers have been generated, a person skilled in the use of statistics can reach meaningful conclusions regarding the data.

Shown below are some typical examples of histograms of various die-varieties of Fugio Cents for which we have at least fifteen or more specimens in each variety. These include varieties 8-B, 9-P, 10-T, 13-X, 15-Y, and 18-U. All of the histograms presented in this report are scaled so that each increment of the horizontal axis equals one grain, and each plotted mark represents one specimen.



Standard Deviation

Tabulated on the Summary Worksheet in addition to AVERAGE are two other statistical numbers generated by the computer. We will only discuss one of these -- standard deviation, identified in the chart as STD.DEV. -- the other number VARIANCE is the square of the Standard Deviation and is tabulated for reference only. The value of the number calculated for the Standard Deviation is important and can be easily visualized. For a normal distribution of data, that is -- a bell shaped curve, + and - one standard deviation of the variation of samples includes approximately 68% of all the specimens in the sample. What this means in our kitchen table example is that if the standard deviation is a large number the specimen weights are widely spread across the top of the kitchen table; however, if this number is very small,, then the specimens are tightly grouped together on our tabletop indicator.

What this means in a practical sense is that the STD.DEV.column for each die-variety, or classification of coinage, such as Fine Ray or Club Ray gives an indication of the consistency in the manufacturing process of these particular specimens. Consider what might be the almost perfect case of quality control in the manufacturing process -- the sheet copper was rolled to almost exactly the correct thickness and uniformly so, no thicker at one edge of the sheet than the other. In addition the planchets were all cut from this perfect sheet on a single planchet cutter that was sharp and in excellent condition. The resulting planchets are essentially uniform, each the correct size and shape with no rim burrs of excess metal or anything of that nature. After coining, each specimen is essentially identical and almost exactly the same weight. The standard deviation for these specimens would be calculated to have a number very close to zero.

Conditions were obviously far from perfect in the Fugio mint. The sheet stock varied in thickness because of uneven rolling and the fact that the rollers were themselves imperfectly round, and not quite parallel with each other, and had surface imperfections that caused the rolled stock to have a very rough and irregular surface as well as being non-uniform in thickness. We don't know too much about the planchet cutter except that it often left significant rim burrs on planchets which would have caused them to be heavier than otherwise. The standard deviation for the actual coins is significantly greater than our almost perfect case postulated above. We have already discovered that a typical value for standard deviation (see the Summary Worksheet) seems be around 15 or 16, but some die-varieties show considerably smaller numbers and some considerably larger.

There is, unfortunately, another factor that can result in an additional spread in our data and one that has nothing to do with the manufacture and subsequent usage of the coins. This is the accuracy of the scales used in the weighing of the specimens and, of course, how carefully these measurements were accomplished. Also, since different weighing instruments were used some may have been less accurate than others and these factors certainly contribute to an increase in variation of the data. This variation is one over which we have no control and we must simply accept a small amount of error in the measurements which can be attributed to this problem.

Results to Date

As we examine the numbers in the Summary Worksheet we can reach some general conclusions. First -- look at Row 5 the Fine Rays summary. We have a total of 587 specimens included in this sample. The average weight of these 587 specimens is 149.72 grains, the highest weight is 197.40 and the lowest 101.00. The authorized weight was 157.5 grains, so today we have a sample group , some in mint state and some in lesser condition, that is about 8 grains less than the authorized weight. We would expect the weight to be somewhat below the authorized weight, even if it had been correct in the beginning because of loss due to wear and tear of 200 years under all sorts of conditions. We do keep track of condition in the spreadsheet but have not applied that criteria in our calculations, as

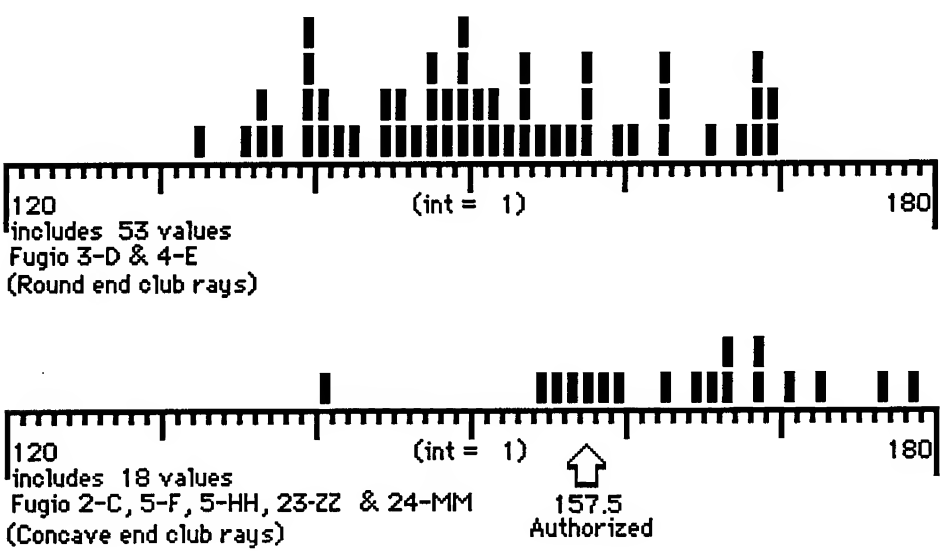
yet. The Standard Deviation (STD.DEV.) for these 585 specimens is 12.78. This means that 68 % of all the specimens in this group lie within the boundaries of 149.66 grains (the average) plus and minus 12.78 grains, or between the limits of 136.88 grains and 162.44 grains.

Next, scan down the listing of STD.DEV. for the various die-varieties and you will note that the majority have a value somewhere near the 12.78 value for the entire group, but with several notable exceptions. The first exception appears to be variety 1-CC with a value of 1.51. Next is 12-KK with a value of 3.00. , but note also that both varieties have only a few specimens counted in the tabulation; three for the 1-CC and six for the 12-KK and we conclude for the moment that there is insufficient data in these two categories to be significant.

It appears that at least fifteen specimens of a single variety are required before the calculated results can be considered significant, or meaningful. Many die-varieties have, so far, less than that number of specimens and, as we have already indicated, a major purpose of this article is to call our Patron's attention to this survey and to request their participation so that we can eventually obtain enough weights data to be meaningful for every die-variety. We do not actually know at present whether this project will produce useful conclusions, or not; however, we believe it is worth investigating and in the process we will certainly learn a bit more about the Fugio Cents of 1787.

So far there has been one surprise discovered in the data and that surprise concerns the Club Ray Fugio varieties. Generally speaking we know that the Club Ray varieties, as a group, are heavier than the Fine Ray varieties. In the chart the average weight of the Fine Ray specimens is 149.66 grains and the Club Ray specimens 152.73 But look at the average weights for the individual die-varieties -- 3-D and 4-D are 150.36 and 149.89 grains -- both very close to the average weight of Fine Ray specimens. Observe however the average weights of the concave end Club Ray Varieties 2-C, 5-F, 5-HH, 23-ZZ and 24-MM all of which are significantly heavier than the round end Club Ray varieties and the Fine Ray varieties.

The following histogram shows the weight variations for the 3-D and 4-D (round end rays) versus the other grouping (concave end) rays. Obviously these two subgroups of the general Club Ray group are quite different in their weight characteristics. This certainly calls for additional investigation. We obviously need more data on other concave ray specimens, but as we know the scarcity of these makes the task difficult.

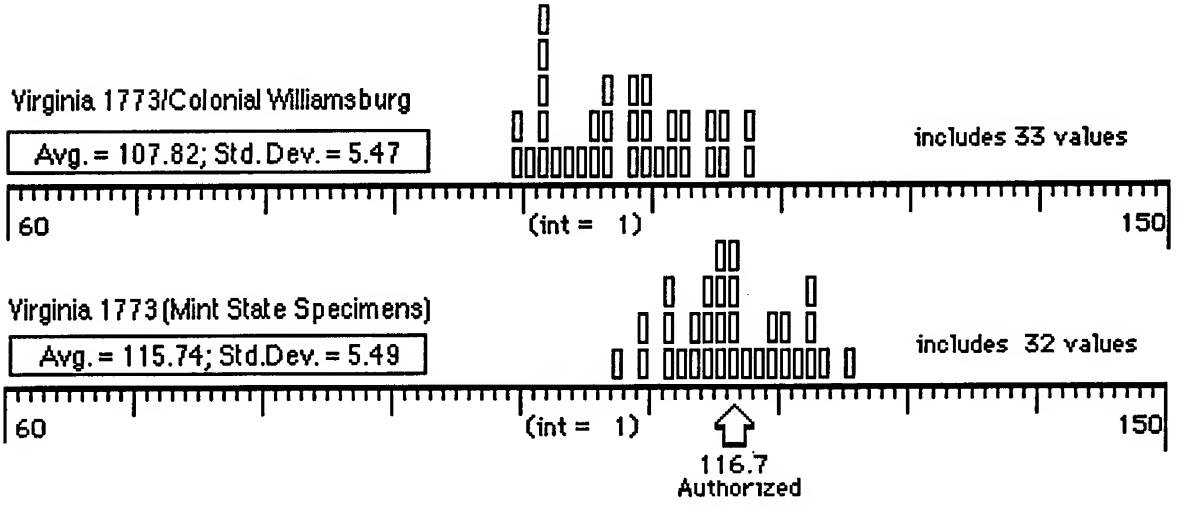


The Virginia Halfpence of 1773

The inclusion of the Virginia Halfpence in this study was originally for purposes of comparison with the Fugios in expectation that the results would indicate superior quality control at the London mint. This assumption appears to be correct. The group of Virginia specimens identified in the histogram on the frontispiece are comparable in condition to the Fugio group -- they are mixed, some are mint state and others are in circulated condition. The standard deviation for the Fugio group is 12.83 while that of the Virginia group is 8.66, and it is the considerably smaller dispersion of the Virginia weights as indicated by the differences in standard deviation, that leads us to conclude that our assumption is correct -- that much better quality control (of weight) existed at the mint in London.

We have not attempted to tabulate the Virginia Halfpence by die-varieties because a great many of the extant specimens have not been attributed by die-variety. Additionally, most extant varieties are in either mint state condition having been preserved in hoards, or they are well circulated, such as those discovered in the archaeological digs at Colonial Williamsburg, Virginia where they were first distributed.

Shown below are histograms for two selected groups of Virginia Halfpence. One is in near mint state condition and can be assumed to represent a typical sample from the group that was delivered from the London mint to the Colony of Virginia. This group of 32 specimens exhibits an average weight of 115.74 grains as compared to the authorized weight of 116.7 grains, and a standard deviation of 5.49. The second group is a similar size group of 33 well circulated specimens which were excavated at Colonial Williamsburg, Virginia. The two groups both have almost identical standard deviations 5.49 vs 5.47, but substantially different average weights. The Colonial Williamsburg group average being 107.82 grains which is 7.92 grains lower than the mint state group. This suggests that the 6.84% weight loss of the Colonial Williamsburg group of can be attributed almost entirely to the wear and tear of the some 215 years since their initial distribution.



Conclusions

It appears from the data obtained to date that there are considerable statistical differences between.several of the Fugio Cent die-varieties. Most varieties exhibit a STD.DEV. between 10 and 15, but some, variety 10-T for example (with 13 specimens in the sample) has a value of 5.9. and 18-U (with 23 specimens in the sample) a value of 6.54, and there are other low values. Indeed it appears that there are two general groups of Fine Ray specimens -- the first having a STD.DEV. of 10 to 15 and the second having a STD.DEV. of 5 to 7. There are also some varieties outside these values but there are not enough specimens in most of these sample to be meaningful, again we need more data!

Accordingly, we again request that our Patrons who were not contacted in the initial survey to please fill out the two survey forms and to return them to ye Editor. We will continue to update the Summary Worksheet and will publish it from time to time in CNL. And -- any of our Patrons who would like to do additional work with the data, please contact ye Editor and he will be happy to work with you in performing other analyses. The raw data can be supplied in several formats including computer disk, but without any identification of ownership since we maintain the confidentially of ownership information. Specimens are identified only by a sequential number assigned as they are entered into the spreadsheet.

Acknowledgments

Our special thanks are extended to several individuals and their public institutions for their cooperation in providing data for this study. In many cases it required considerable time consuming effort to weigh specimens, and sometimes attribute them by die-variety, in order to generate the information. Our very sincere thanks is also extended to our Patrons who have assisted with information regarding their personal collections.

American Numismatic Association
Robert W. Hoge; Museum Curator

American Numismatic Society
William L. Bischoff; Assistant Curator, Modern Coins & Currency

Colonial Williamsburg Foundation; Department of Archaeology
Michael Lewis; Assistant Collections Manager

Mercantile Money Museum
Gene Hessler; Curator

Smithsonian Institution -- National Numismatic Collection
L. W. Vosloh; Museum Specialist

Additionally,

(1) Our thanks to *Beth Piper* of Auctions by Bowers & Merena, Inc. for her special efforts in weighing and attributing the Fugio specimens from the Norweb (III) auction sale well in advance of the usual sale procedures.

(2) And to *William R. Engels* of the Genetics Department of the University of Wisconsin -- Madison for the use of his "Histogram Maker" shareware computer program for the Macintosh that generates the Histograms used in illustrating this report.

JCS

Appendix A -- Summary Worksheet

		FUGIO CENTS OF 1787 -- SUMMARY WORKSHEET						
							1984	
VARIETY	COUNT	AVERAGE	HI	LOW	STD.DEV.	VARIANCE	RARITY	NOTES
Fine Rays	**590**	**149.73**	**197.4**	**101**	**12.85**	**165.09**		A
1-B	19	140.09	162.2	112.6	10.99	120.88	R5	
1-B (0°)	0	#DIV/0!	0	0	#DIV/0!	#DIV/0!		B
1-L	10	148.69	164	130.8	13.21	174.39	R6	
1-Z	4	152.54	164	144.7	8.16	66.65	R7	
1-Z (0°)	0	#DIV/0!	0	0	#DIV/0!	#DIV/0!		C
1-CC	3	145.40	147	144	1.51	2.28	R7	
6-W	16	151.72	181.15	135.9	15.46	239.08	R4	
7-T	20	150.33	181.15	120	15.61	243.66	R4	
8-B	28	148.61	175	110.96	15.36	235.97	R1	
8-X	20	147.25	185.4	103	16.43	269.94	R2	
9-P	21	150.15	162	138.8	5.96	35.54	R4	
9-Q	5	147.67	154.7	134.26	8.35	69.77	R5	
9-S	6	152.98	163.1	134.7	9.74	94.86	R7	
9-T	7	156.06	179	140	12.62	159.36	R6	
10-G	6	155.91	170.4	148.28	8.57	73.51	R7	
10-T	14	155.05	165.9	146	5.67	32.12	R6	
10-OO	1	161.60	161.6	161.6	#DIV/0!	#DIV/0!	R8	
11-A	8	147.70	162.9	130.6	11.15	124.42	R6	
11-B	11	157.18	171.6	126.54	15.83	250.50	R4	
11-X	12	153.61	182.6	122	18.92	358.12	R4	
12-M	16	153.63	175.2	140.1	10.77	116.04	R4	
12-S	13	151.11	170.8	137.25	11.28	127.24	R5	
12-U	14	153.79	171.43	138	11.17	124.75	R5	
12-X	17	153.37	169.73	121.9	12.17	148.20	R1	
12-Z	7	156.55	175.7	132.54	13.03	169.88	R7	
12-Z (0°)	2	142.75	149.7	135.8	9.83	96.60	R8	
12-KK	6	157.51	160	153	3.00	8.97	R6	
12-LL	3	153.79	159.3	147.37	6.02	36.20	R7	F
13-N	12	142.92	159.85	131	9.41	88.61	R7	
13-R	16	147.86	168	121.7	12.46	155.14	R5	
13-X	36	153.05	197.4	114.34	16.43	270.05	R1	
13-KK	3	156.60	160.8	148.8	6.76	45.72	R8	
14-H	0	#DIV/0!	0	0	#DIV/0!	#DIV/0!	R8	
14-O	12	152.92	164	144	5.71	32.62	R4	
14-X	0	#DIV/0!	0	0	#DIV/0!	#DIV/0!	R8	
15-H	10	148.42	158	139	6.80	46.21	R5	
15-K (0°)	5	149.19	161.8	134.26	11.05	122.19	R7	D
15-V	7	139.52	166	123	16.28	265.03	R6	
15-Y	34	146.05	164	121.5	13.15	172.89	R4	
16-H	8	143.90	163	101	20.96	439.20	R6	
16-N	14	152.14	168.2	128.6	10.19	103.85	R5	
17-I	1	144.80	144.8	144.8	#DIV/0!	#DIV/0!	R8	
17-S	14	143.04	168	124.7	11.77	138.47	R4	A
17-S (DblWt)	1	#DIV/0!	333	333	#DIV/0!	#DIV/0!	R8	
17-WW	3	149.23	152	144.8	3.88	15.04	R7	

Appendix A - Continued

VARIETY	COUNT	AVERAGE	HI	LOW	STD.DEV.	VARIANCE	1984 RARITY	NOTES
18-H	13	148.84	173	134	11.37	388.00	R6	
18-U	23	154.01	166	142	6.54	42.82	R5	
18-X	6	151.80	168	126.9	14.94	223.30	R7	
19-M (0°)	6	150.47	167.5	134	11.69	136.72	R7	D
19-Z	17	144.30	170.3	122	12.96	167.94	R6	
19-Z (0°)	1	135.00	135	135	#DIV/0!	#DIV/0!	R8	
19-SS	10	149.76	163.1	127.6	13.56	183.79	R7	D?
19-SS (0°)	2	161.65	162.2	161.1	0.78	0.61	R8	
20-R	9	149.50	157.69	131	8.96	80.30	R6	
20-X	7	135.00	163.1	104.9	19.63	385.30	R6	
21-I	17	147.93	168.9	126	10.63	113.08	R5	
22-M (0°)	9	153.52	175	129.61	14.90	222.06	R6	D & E
Club Rays	**76**	**152.73**	**180.3**	**118**	**11.93**	**142.22**		
2-C	10	164.24	180.3	140.8	12.77	163.00	R7	
3-D	28	150.36	169	118	11.69	136.65	R3	
4-E	26	149.89	169	135.8	10.01	100.18	R3	
5-F	4	166.30	170	164	2.63	6.89	R7	
5-HH	3	163.80	168	157.4	5.63	31.72	R8	
23-ZZ	1	159.00	159	159	#DIV/0!	#DIV/0!	R8	
24-MM	1	158.00	158	158	#DIV/0!	#DIV/0!	R8	
New Havens	**36**	**154.75**	**231.4**	**125.3**	**21.84**	**477.07**		
101-AA (Co)	2	157.65	173.5	141.8	22.42	502.45	R8	
101-BB (Si)	1	152.8	152.8	152.8	#DIV/0!	#DIV/0!	R8	
101-EE(Co)	1	140.9	140.9	140.9	#DIV/0!	#DIV/0!	R8	
101-EE (Si)	1	151.9	151.9	151.9	#DIV/0!	#DIV/0!	R8	
102-GG(Go)	1	231.40	231.4	231.4	#DIV/0!	#DIV/0!	R8	
103-EE (Si)	1	151.80	151.8	151.8	#DIV/0!	1.00	R8	
103-EE (Br)	1	125.30	125.3	125.3	#DIV/0!	#DIV/0!	R7	
104-FF (Go)	0	#DIV/0!	0	0	#DIV/0!	#DIV/0!	R8	
104-FF (Si)	7	177.19	179	174	1.83	3.35	R6	
104-FF (Br)	7	143.86	163	139	8.54	72.97	R4	
104-FF (Co)	12	144.32	196.3	135.6	16.60	275.58	R1	
104-FF(Co) 0°	1	160.70	160.7	160.7	#DIV/0!	#DIV/0!	R8	
105-JJ (Si)	2	161.59	162.17	161	0.83	0.68	R8	
Obv. 106	0	#DIV/0!	0	0	#DIV/0!	#DIV/0!		
Obv. 107	0	#DIV/0!	0	0	#DIV/0!	#DIV/0!		
Rev. UU	0	#DIV/0!	0	0	#DIV/0!	#DIV/0!		

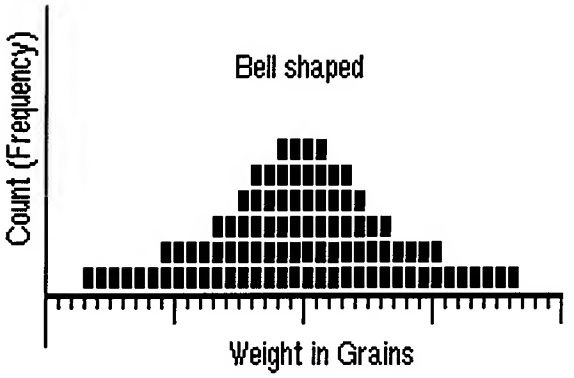
NOTES	
A	Norweb Sale double thickness (333.0 grain) 17-S is omitted from this category. (Norweb:3549)
B	Upset reverse (0°) for variety 1-B was reported on 7-14-76
C	Upset reverse (0°) for variety 1-Z was reported on 9-26-83
D	All known specimens have upset reverses. (0°)
E	Upset reverses of variety 22-M have the widest range of variation of 0° +/- 30°
F	Variety 12-LL includes specimens reported as (Kessler) 12-N.2

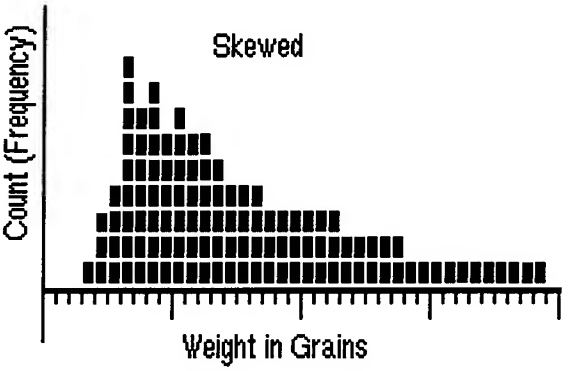
Editor's Note: The symbol #DIV/0! which appears in several places in the chart is a notation generated by the computer to alert us to the fact that there are an insufficient number of specimens in the sample to make the necessary calculations.

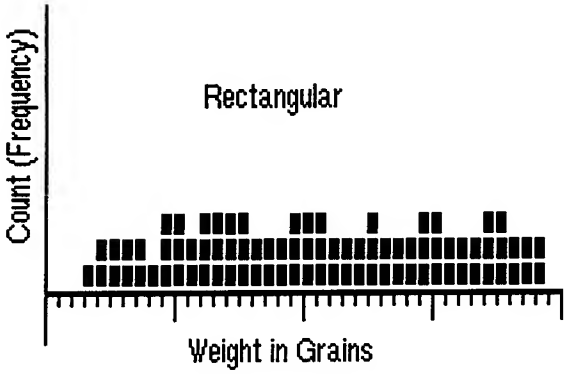
Appendix B

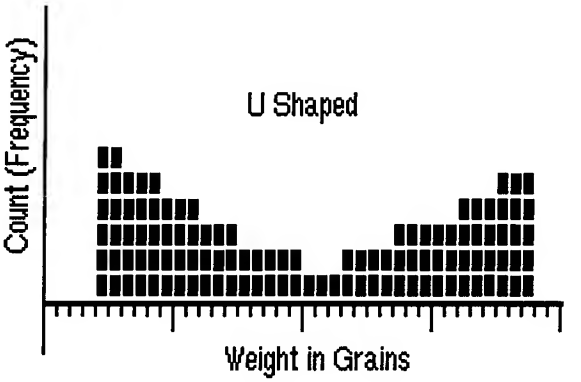
The histograms shown below illustrate three important characteristics of distribution of data -- shape, position, and dispersion. These are typical groupings that are likely to be encountered in data collection. These examples are plotted in the same manner as other histograms presented in this report -- each increment along the horizontal axis is equal to one grain in weight and each mark indicates a single coin.

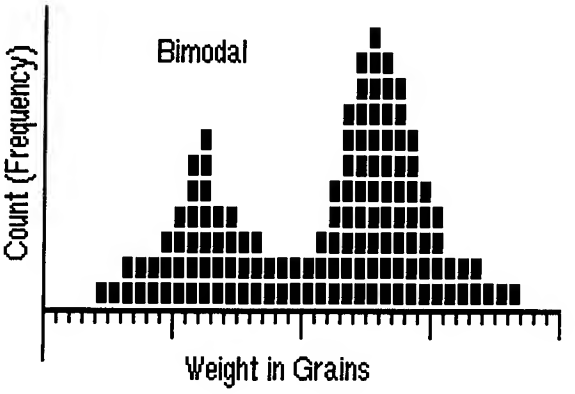
A. Typical shapes of data distribution





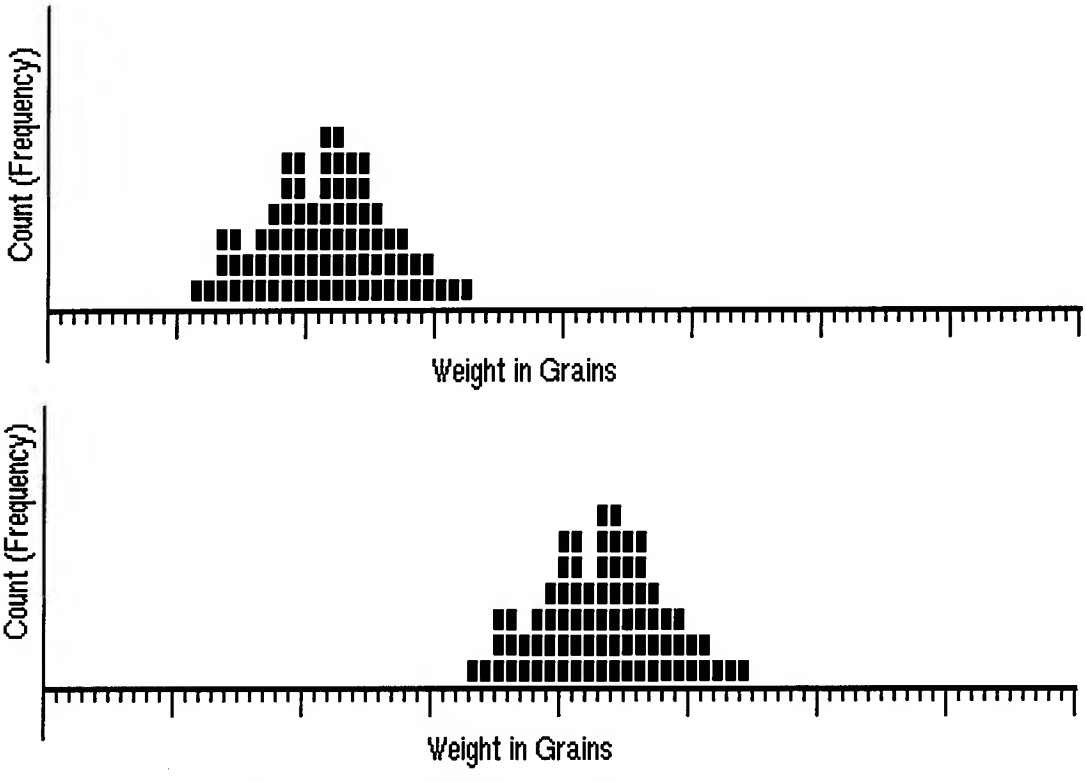






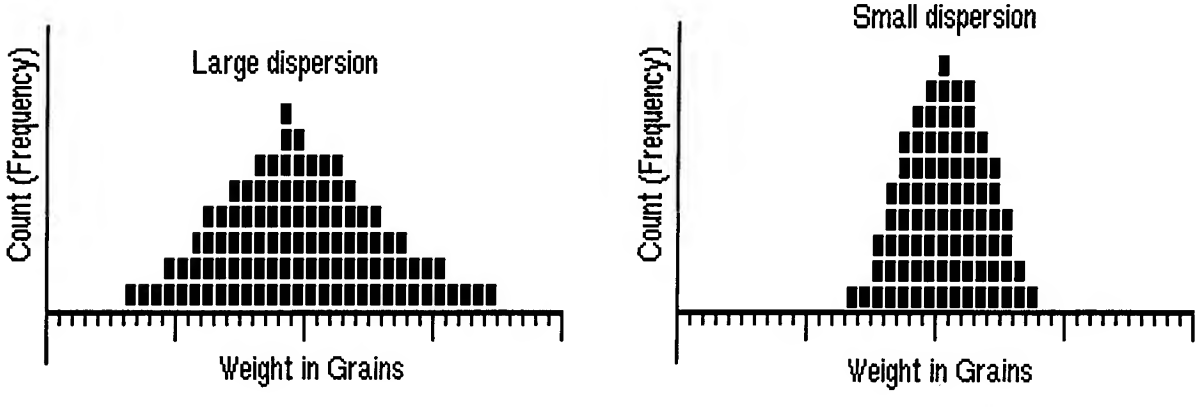
The bell-shaped, or normal, group is the distribution usually encountered in a similiar group of objects having common characteristics. The other shapes indicate something unusual regarding the data.

B. <u>Position</u> along the horizontal axis.



These two examples would both have approximately the same standard deviation, but the average value of the upper group would be less than the average value of the lower group.

C. <u>Dispersion,</u> or how spread out or clustered together the data may be.



The data having small dispursion would have a numericallly small standard deviation. The data having the large dispersion would have a larger numerical value for standard deviation.

APPENDIX C -- FUGIO SURVEY FORM

	CNL FUGIO CENT SURVEY -- Jan.1, 1988 Effective Date				
	NAME or ID Code				
Inventory Number	Die Variety	Grade	Weight in Grains	Provenance	Remarks

APPENDIX C -- VIRGINIA SURVEY FORM

	CNL VIRGINIA HALFPENCE SURVEY -- April 1, 1988 Effective Date				
	NAME or ID Code				
Inventory Number	Die Variety	Grade	Weight in Grains	Provenance	Remarks

GERARDUS DUYCKINCK, JUNIOR
PETITIONER FOR A NEW YORK STATE COINAGE GRANT

by Gary A. Trudgen

In 1787, during the tenth session of the New York State legislature, there was considerable interest in establishing a copper coinage within the state. The Journal of the Assembly of the State of New-York for 1787, as printed by Samuel and John Loudon (printers for the state), contains five entries relative to petitions that were submitted requesting the right to perform this coinage. The Assembly met in New York City from January 12 through April 21. The five entries are recorded as follows:

Gerardus Duyckinck, Junior
(1723-1797)
Source: New York Historical Society
Painting by Lawrence Kilburn; c. 1755-60

Friday February 2: "A petition of James F. Atlee, relative to the coinage of copper, was read, and referred to Mr. Doughty, Mr. E. Clark, and Mr. Taylor."

Monday February 5: "A petition of Gerardus Duyckinck, junior, praying an exclusive appointment for the coinage of copper in this state (if such coinage shall be established) was read and referred to Mr. Brooks, Mr. Galatian, and Mr. Duboys."

Monday February 12: "The several petitions of John Bailey and Ephraim Brasher, relative to the Coinage of Copper within the state, were read, and referred to Mr. Brooks, Mr. Galatian, and Mr. Duboys."

Friday February 16: "A petition of Daniel Van Voorhis and William Coley, relative to the Coinage of Copper, under the direction of this state, was read, and referred to Mr. Brooks, Mr. Galatian, and Mr. Duboys."

Saturday March 3: "A petition of Thomas Machin, relative to the Coinage of Copper in this state, was read, and referred to Mr. Brooks, Mr. Duboys, Mr. Doughty, Mr. E. Clark, and Mr. Taylor."

All but one of the petitions were submitted by men who were involved or later became involved in the state coinages. For example, the first petition, which was read on February 2, was submitted by James F. Atlee. He was one of the most prolific die engravers during the state coinage era. Atlee first worked in New York City at an unauthorized mint before going to work for the legal Rahway, New Jersey mint. Finally he joined with Thomas Machin and four others to establish the well-known Machin's Mills operation near Newburgh, New York. The third entry on February 12 records that several petitions were submitted by John Bailey and Ephraim Brasher. They operated another unauthorized New York City mint which produced several pattern coins and the celebrated Brasher doubloon. John Bailey also engraved dies and struck New Jersey coppers, apparently at the request of New Jersey coiner Matthias Ogden. The fourth petition was read on February 16 and was submitted by Daniel Van Voorhis and William Coley. They were silversmiths and business partners in New York City. When Reuben Harmon, Junior obtained a coinage grant from the Republic of Vermont, they joined with Harmon. The final petition, which was read on March 3, came from Thomas Machin. He operated another unauthorized coinage firm located at his mills on the

eastern shore of Orange Lake near Newburgh, New York. As already noted James F. Atlee was a partner in this operation, and when the Harmon and Machin firms merged in June 1787, Daniel Van Voorhis and William Coley also became partners. In contrast, there are no known records that Gerardus Duyckinck, Junior, the man who filed the second petition, was further involved with the state coinages.

New York State chose not to produce their own copper coinage, which dashed the hopes of those seeking a coinage grant. Instead the Assembly passed an act to regulate the circulation of copper coins within the state. Since Gerardus Duyckinck was not subsequently involved in some other aspect of the state coinages, he is virtually unknown in the literature dealing with the state coinages. So, who was this man that submitted the second petition desiring "an exclusive appointment for the coinage of copper" in New York State?

He was of Dutch heritage and was the oldest son of Gerardus and Johanna Duyckinck. He was baptized in the Dutch Church in New York City on March 20, 1723. When he came of age, he was trained in his father's painting business. After his father died in 1746 he took over the business, located near Old Slip Market, and advertised that he could provide limning, painting, varnishing, japanning, gilding, glazing, and silvering of looking glasses. He also stated that he would teach any young gentleman the art of drawing and painting on glass. Later he sold glass, spectacles, telescopes, maps, engraved prints, art supplies, etc. in a general store he called the "Universal Store" or "The Medley of Goods." Through his unique newspaper advertising he earned the reputation of being the most progressive advertiser in North America. In 1752 he married Ann Rapelje, daughter of George and Dina Rapelje of Brooklyn Ferry. To them were born Gerardus III in 1754, Diana in 1759, and Johanna in 1760. A lifetime resident of New York City, Gerardus died in 1797.

The portrait of Gerardus Duyckinck, Junior is attributed to artist Lawrence Kilburn and was painted circa 1755-60. It shows him in the prime of his life, a successful merchant and painter. The portrait, which is oil on canvas, is owned by The New-York Historical Society. An accompanying portrait of Gerardus' wife, Ann, is also owned by the Society. Both portraits were the gift of Mrs. Fanny F. Clark.

Gerardus was nearly 64 years old when he submitted the petition requesting an exclusive appointment to coin copper for the state. Obviously he believed that he had the capability to perform this coinage. One wonders what facilities, equipment, and people he intended to bring together to accomplish this task.

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Comments on "Matthias Ogden, New Jersey State Coiner"
● from Michael Hodder; Wolfeboro, NH (TN-119)

Gary Trudgen's "Matthias Ogden, New Jersey State Coiner" which appeared in v.28, n.2 (June, 1988) of this newsletter is a very welcome addition to the literature on New Jersey state coppers. We have not had a well-researched biography of Ogden that drew together the salient points of his career before now, and the picture that emerges from Gary's study gives us a glance at Ogden's character that can only broaden our understanding of the part he played in the minting of New Jersey coppers from 1788 to 1789/90.

There is one small point regarding Ogden's role in the coinage that should be clarified. This has to do with the varieties attributed by Gary to Ogden's "mint" in Elizabethtown.

Two major attribution *schema* have been proposed for varieties of New Jersey coppers, Bill Anton's and Walter Breen's, and while they differ for many they are both in agreement for varieties 34-J, 34-V, 35-J, 35-W, 36-J, 37-X, and 37-f, all dated 1787 and attributed to Matthias Ogden at Elizabethtown. Both of these *schema* rely heavily on the fact that these varieties are known overstruck on many different types discredited during the coppers panic of 1789. It has become accepted that Ogden did not maintain the facilities to melt, roll, anneal, and cut his own planchets, and so relied on other coppers withdrawn or bought up for his planchet stock. The recollection of Mrs. William Chetwood, which was a remarkably detailed memory of an event nearly seventy years in her past, seems to suggest that Ogden's facility had only the coining press his widow later sold to Cox and no other minting equipment.

I would like to suggest that the true picture of Ogden's activities in minting New Jersey coppers was more complex than is usually described. Further, the attribution *schema* proposed by Breen and Anton do not appear to be supported by the evidence of the coins themselves.

I have records of 26 different 34-J specimens; 10 pieces were overstruck on Connecticut coppers or Nova Eboracs, while 16 were not on host coins. Of the eleven 34-V I have recorded, 7 were overstruck (three on other New Jersey coppers) and 4 were not on host coins. Of the seven 35-J coins I have recorded 3 were overstruck and 4 were not. The single 35-W recorded in my database was overstruck on a 1787 Connecticut. None of the five 36-J pieces I recorded were overstrikes, nor were any of the three 37-x or the twelve 37-f coins I recorded. If the attribution of these varieties to Ogden is correct then a second, supplemental, explanation for the source of his planchet stock must be found.

A study of New Jersey reverse J is scheduled to be published later next year. In that paper I studied 120 different specimens of J family varieties and based upon the progressive failure of reverse J it appeared that some quantity of 34-J was contemporaneous with most 14-J and some 13-J and 18-J seen. A further quantity of 34-J, as well as some 37-J, were coeval with most 13-J and 15-J, as well as with the rest of the 18-J and about half of the 16-J seen. Some 36-J, many 34-J, the remaining 14-J, and the majority of 17-J also appeared to be contemporaries. Most of the 35-J and 36-J studied were struck late in the life of reverse J, but were seen in the same reverse state as many 13-J, 15-J, 16-J, and 17-J. Variety 37-J, not attributed to Ogden by Breen or Anton, appears to have been the last member of the J family to have been struck in quantity.

The die emission sequence suggested by the coins themselves seems to indicate that the entire J family of dies was backdated. Based upon the inadequate historical record and the progressive failure of reverse J I concluded that some 34-J and 37-J were struck either by Goadsby and Cox before the latter's incarceration or by Goadsby alone in the latter half of 1787. The remaining 34-J and 37-J, as well as most, if not all, 35-J and 36-J were struck by Ogden at Elizabethtown. Since slightly more than half of the 35-J and all the 36-J I examined were not overstrikes, it would appear that Ogden's operation was more sophisticated than we have been led to believe. It is not inconceivable that the award to Ogden of Cox's tools by the New Jersey Chancery Court on June 7, 1788 included more than simply the press later sold

to the U.S. Mint. If Ogden did indeed strike the varieties usually attributed to him, then he must have had access to fresh (i.e., not already coined) planchet stock.

New Jersey coppers present many such difficult problems. The absence of letter files, mint records, and other supporting documents makes their study frustrating at times and always extremely complicated. Our best evidence is the coins themselves, and the stories they tell are rich and illuminating. It appears that the *corpus* of secondary source literature that has grown up in the last 30 years needs to be re-evaluated.

Editor's note: Gary's response regarding the "varieties attributed by Gary" to Ogden's home mint is the following: "I have not (personally) studied the coppers attributed to Ogden's mint by Anton and Breen. When I wrote my Ogden paper I relied upon their research when I decided to include a photo of a New Jersey copper (Maris 34-J) struck at Ogden's home mint."

CORRECTION to TN-117 **(TN-117B)**

● **by Ye Editor**

While typing the text for TN-117 which appeared in the preceding issue, ye Editor failed to enter the duplicate VI in the string of Roman Numerals describing Obverse 4 & 5. The corrected text for that entry -- on page 1028 -- is the following:

Obverse 4/5. CURRENCEY/Florlated Cross.

I II III //// V VI VI VII VIII XI X IX IIX

Same failure to rotate as seen above. Conventional VIII for 8. Duplication of VI created 13 numerals on the sun dial face.